

Serial No. 09/277,893

**REMARKS**

The Final Office Action of December 8, 2005, has been received and reviewed.

Claims 17-33, 50-72, and 74-105 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

**Rejections under 35 U.S.C. § 103(a)**

Each of claims 17-33, 50-72, and 74-105 has been rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

**Fischer in View of Chen**

Claims 17, 19-24, 26-33, 102, and 103 have been rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over the subject matter taught in U.S. Patent 5,185,291 to Fischer et al. (hereinafter "Fischer"), in view of teachings from U.S. Patent 5,712,206 to Chen (hereinafter "Chen").

Fischer teaches a fuse for use in a semiconductor device structure, as well as a process for fabricating the fuse. The fuse of Fischer, which is disposed over an insulative structure (*i.e.*, dielectric 10) (*see, e.g.*, FIGs. 1-4; col. 2, lines 29-36), includes a first conductive layer 11 and a second conductive layer 12. The first conductive layer 11 of the finished fuse may be formed from aluminum or tungsten (col. 2, lines 43-45) and includes two spaced apart end regions (FIG. 3). The second conductive layer 12 of the fuse may be formed from the same

Serial No. 09/277,893

material as the first layer 11 or from polysilicon. Col. 2, lines 59-63. In a finished fuse, such as that illustrated in FIG. 3 of Fischer, end portions of the second conductive layer 12 overlie the spaced apart regions of the first conductive layer 11, while the central portion 111 of the second conductive layer 12 is located in substantially the same plane as the first conductive layer 11 and between the spaced apart portions of the first conductive layer 11. *See also*, col. 2, lines 56-58.

Fischer teaches that the fuse may be fabricated by forming a first layer of conductive material 11 over an insulative structure 10 (FIG. 1; col. 2, lines 45-48), patterning a "window" 111 in the first layer of conductive material to expose a portion of the underlying insulative structure (FIG. 1; col. 2, lines 36-38; col. 3, lines 34-55), forming a second layer 12 of conductive material over the first layer 11 and within the window 111 (FIG. 2; col. 2, lines 49-55), and patterning the "combined" first and second layers to form the fuse (FIG. 3; col. 2, lines 56-58).

Chen likewise teaches a fuse and a method for fabricating the fuse. The fuse of Chen may be formed from aluminum, titanium tungsten, a silicide or polycide, or polysilicon. Col. 5, lines 59-63, but only includes a single material layer.

A portion of the fuse described in Chen is exposed by way of a so-called fuse "window." *See, e.g.*, col. 4, lines 50-54. This "window" facilitates programming of the fuse with a laser. *See* col. 7, lines 38-40. In order to prevent contamination of the fuse prior to programming thereof, as well as to prevent contamination of the underlying semiconductor device features following programming of the fuse, Chen teaches a method for forming a moisture barrier both above and beneath the window of the fuse.

*A prima facie* case of obviousness has not been established with respect to the subject matter recited in claims 17, 19-24, 26-33, 102, and 103. Without the benefit of hindsight that the claims and disclosure of the above-referenced application provide to the Examiner, one of ordinary skill in the art wouldn't have been motivated to combine the teachings of Fischer and Chen in the manner that has been asserted.

The teachings of Fisher are limited to methods for fabricating fuses with multiple conductive layers, none of which includes a silicide. Neither Fisher nor Chen provides one of ordinary skill in the art with any reason to substitute a silicide for one of the conductive layers of

Serial No. 09/277,893

the fuse of Fisher. In fact, Fisher touts the usefulness of aluminum, tungsten, and polysilicon for use in forming the programmable portion of the fuse disclosed therein.

The teachings of Chen, in contrast, are limited to fuses that comprise a single layer of silicide. Neither Chen nor Fisher includes any teaching or suggestion that would have provided one of ordinary skill in the art with any reason to add an additional layer of conductive material at either terminal end of the single layer silicide fuse taught in Chen.

From the teachings of Fisher and Chen, it is apparent that without the benefit of hindsight that has been afforded to the Examiner, one of ordinary skill in the art would have had no motivation to combine teachings from Fisher and Chen in the manner that has been asserted. Further, no teachings that were generally available to those of ordinary skill in the art at the appropriate time have been supplied to show otherwise. As such, it is clear that the 35 U.S.C. § 103(a) rejection of claims 17, 19-24, 26-33, 102, and 103 is based entirely upon an improper hindsight reconstruction of the subject matter recited in these claims.

Moreover, by touting the usefulness of aluminum, tungsten, or polysilicon for use in forming the programmable portion of the fuse described therein, Fischer teaches away from the asserted motivation to substitute a silicide for one of these materials in the programmable portion of a fuse.

Therefore, a *prima facie* case of obviousness of claims 17, 19-24, and 26-33 has not been established pursuant to the requirements of 35 U.S.C. § 103(a). Accordingly, claims 17, 19-24, 26-33, 102, and 103 are drawn to subject matter that is allowable over the teachings of Fischer and Chen.

Fischer, Chen, and Mitani

Claim 18 is rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is purportedly unpatentable over teachings from Fischer, in view of the teachings of Chen and, further, in view of the subject matter taught in Japanese Patent Publication 59-154038 of Mitani (hereinafter "Mitani").

Mitani teaches a fuse with lower layer that is formed from polycrystalline silicon and an upper layer with spaced apart regions that are formed from a metal silicide, as well as methods

Serial No. 09/277,893

for fabricating such a fuse. Mitani, Abstract. In the fabrication method, the polycrystalline silicon is first deposited on a field oxide. *Id.* Next, a layer of metal silicide is formed over the polycrystalline silicon, and the layers are etched in combination. *Id.* Finally, the intermediate part of the metal silicide is etched, leaving only polycrystalline silicon as the central region of the finished fuse, the portion of the fuse that is to be ruptured. *Id.*

Claim 18 is allowable, among other reasons, as depending from claim 17, which is allowable.

Moreover, Mitani does not remedy the deficiencies that have been noted previously herein with respect to the asserted combination of Fischer and Chen. Specifically, one of ordinary skill in the art would not have been motivated to combine the teachings of Mitani with those of Fischer or Chen in the manner that has been asserted in the outstanding office action.

The teachings of Fischer are limited to methods for fabricating a multi-layer fuse, the upper layer of which is configured to be "blown" to program the fuse. None of the layers of that fuse comprises metal silicide. Nor does Fischer provide one of ordinary skill in the art with any motivation to use metal silicide to form one of the layers of the fuse described therein.

Chen teaches a method for forming a single-layer fuse from a variety of materials, including metal silicide, but does not provide one of ordinary skill in the art with any motivation to also use another conductive material and, thus, multiple layers at the ends, or terminals, of the fuse.

While Mitani includes the combined use of a metal silicide layer with a polysilicon layer, Mitani teaches that the upper metal silicide layer, not the lower polysilicon layer, is patterned to form discrete, spaced apart regions and that the lower polysilicon layer, not the upper metal silicide layer, is useful for forming the region of the fuse which is to be ruptured.

One of ordinary skill in the art wouldn't have been motivated to combine teachings from Fischer, Chen, and Mitani in the asserted manner because none of these references would have provided one of ordinary skill in the art with any clear guidance as to the function of metal silicide as the fusible element of a multi-layered fuse.

For these reasons, one of ordinary skill in the art wouldn't have been motivated, either by the teachings of Fischer, Chen, and Mitani, or by the knowledge that was available to one or

Serial No. 09/277,893

ordinary skill in the art prior to the filing date of the above-referenced application, to combine the teachings of Fischer, Chen, and Mitani in the manner that has been asserted.

Any such motivation could only have been improperly gleaned from the hindsight which the description of the above-referenced application provides.

Furthermore, one of ordinary skill in the art wouldn't have had any reason to expect that combining the methods described in Fischer, Chen, and Mitani would result in the method that is recited in claim 18. This is primarily due to directive provided in M.P.E.P. § 2141.02 that, in combining reference teachings, the teachings of the references must be considered in their entireties. Due to the extreme divergence between the methods of Fischer, Chen, and Mitani, there is no way all of the teachings of these references could be considered in developing a fuse fabrication method such as that to which claim 18 is directed. The most likely result of such a combination would resemble the method taught in Mitani, without removal of material of the metal silicide layer from the region of the fuse which is configured to rupture during patterning of the metal silicide layer.

As a *prima facie* case of obviousness has not been set forth, claim 18 recites subject matter which is allowable over teachings from Fischer, Chen, and Mitani.

Fischer, Chen, and Sandhu

Claim 25 stands rejected under 35 U.S.C. § 103(a) for being directed to subject matter that is allegedly unpatentable over the teachings of Fischer, in view of the subject matter taught in Chen and, further, in view of teachings from U.S. Patent 5,231,056 to Sandhu (hereinafter "Sandhu").

Sandhu teaches a process for depositing a tungsten silicide film on a substrate using chemical vapor deposition.

Claim 25 is allowable, among other reasons, as depending from claim 17, which is allowable. Claim 25 is further allowable since Sandhu, which merely teaches a process for depositing a tungsten silicide film by chemical vapor deposition, does not provide any teaching or suggestion that remedies the aforementioned deficiencies in the asserted combination of Fischer and Chen.

Serial No. 09/277,893

Fischer, Mitani, and Chen

Claims 50, 51, 55-60, and 62-68 have been rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over the subject matter taught in Fischer, in view of teachings from Mitani and, further, in view of teachings from Chen.

The reasons that one of ordinary skill in the art wouldn't have been motivated to combine the teachings of these references in the asserted manner and the reasons that one of ordinary skill in the art would have no reason to expect the asserted combination to be successful have been set forth above.

For these same reasons, the asserted combination of Fischer, Mitani, and Chen cannot support a *prima facie* case of obviousness, pursuant to 35 U.S.C. § 103(a), against independent claim 50. Therefore, under 35 U.S.C. § 103(a), independent claim 50, as well as each of claims 51, 55-60, and 62-68, which depend either directly or indirectly from claim 50, is allowable over the subject matter taught in Fischer, Mitani, and Chen.

Fischer, Mitani and Chen in view of Degelormo

Claims 52-54, 69, and 70 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter that is allegedly unpatentable over the subject matter taught in Fischer, in view of teachings from Mitani, Chen, and U.S. Patent 5,242,859 to Degelormo et al. (hereinafter "Degelormo").

The teachings of Fischer, Mitani, and Chen have been summarized previously herein.

Degelormo merely teaches a chemical vapor deposition (CVD) method for forming layers of conductively doped polysilicon. Degelormo includes no teaching or suggestion that the CVD process thereof may be used to fabricate any part of a fuse or structures associated directly with a fuse.

As Degelormo merely teaches a CVD method for forming layers of conductively doped polysilicon without teaching or suggesting that the CVD process thereof may be used to fabricate any part of a fuse or structures associated directly with a fuse, Degelormo includes no teaching or suggestion that would remedy the deficiencies of Fischer, Mitani, and Chen with respect to their

**Serial No. 09/277,893**

inabilities to have provided one of ordinary skill in the art with the requisite motivation to make the asserted combination of reference teachings.

Nor do the teachings of Degelormo provide one of ordinary skill in the art with any additional reason to believe that the teachings of Fischer, Mitani, Chen, and Degelormo could be successfully combined to provide a method for fabricating a fuse.

Furthermore, claims 52-54, 69, and 70 are each allowable, among other reasons, as depending from claim 50, which is allowable.

Therefore, under 35 U.S.C. § 103(a), claims 52-54, 69, and 70 are directed to subject matter which is allowable over the teachings of Fischer, Mitani, Chen, and Degelormo. As such, it is respectfully requested that the 35 U.S.C. § 103(a) rejections of claims 52-54, 69, and 70 be withdrawn.

Fischer, Mitani, Chen, and Sandhu

Claim 61 stands rejected under 35 U.S.C. § 103(a) for being drawn to subject matter which is assertedly unpatentable over that taught in Fischer, Mitani, Chen, and Sandhu.

As explained previously herein, Sandhu does not provide any teaching or suggestion that remedies the deficiencies that have been identified herein with respect to the asserted combination of Fischer and Chen. For the same reasons, as well as those discussed previously herein with respect to the asserted combination of Fischer, Mitani, and Chen, Sandhu would not remedy the deficiencies that have been noted regarding the asserted combination of Fischer, Mitani, and Chen. Therefore, a *prima facie* case of obviousness cannot be established against claim 61 based merely upon the asserted combination of teachings from Fischer, Mitani, Chen, and Sandhu.

Claim 61 is also allowable, among other reasons, for depending from claims 50 and 60, which are allowable.

Serial No. 09/277,893

Mitani, Fischer, and Chen

Claims 71, 74-86, 88-96, 101, 104, and 105 are rejected under 35 U.S.C. § 103(a) for reciting subject matter which is purportedly unpatentable over the teachings of Mitani, in view of teachings from Fischer and Chen.

Independent claim 71 recites a method of fabricating a gate and a fuse that includes patterning regions of a layer of polysilicon to form laterally discrete, spaced apart regions of polysilicon around and between which an underlying field oxide region is exposed.

For the same reasons provided previously herein, one of ordinary skill in the art wouldn't have been motivated to combine the teachings of Mitani, Fischer, and Chen in the asserted manner. Moreover, for reasons presented previously herein, one of ordinary skill in the art would have had no reason to believe that combining the teachings of these references would result in the method recited in claims 71, 74-86, 88-96, and 101 of the above-referenced application.

Therefore, a *prima facie* case of obviousness cannot be established based on the teachings of Mitani, Chen, and Fischer. Therefore, under 35 U.S.C. § 103(a), the subject matter recited in claims 71, 74-86, 88-96, 101, 103, and 104 is allowable over the subject matter taught in Mitani, Chen, and Fisher.

Mitani, Fischer and Chen in view of Degelormo

Claim 72 stands rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Mitani, Fischer, Chen, and Degelormo.

Claim 72 is allowable, among other reasons, as depending from claim 71, which is allowable.

Mitani, Fischer and Chen in view of Sandhu

Claim 87 is rejected under 35 U.S.C. § 103(a) for being directed to subject matter that is purportedly unpatentable over the subject matter taught in Mitani, Fischer, Chen, and Sandhu.

Claim 87 is allowable, among other reasons, as depending from claim 71, which is allowable.



**Serial No. 09/277,893**

**Mitani, Fischer and Chen in view of Ukeda**

Claim 97-100 have been rejected under 35 U.S.C. § 103(a) for being drawn to subject matter which is allegedly unpatentable over teachings from Mitani, Fischer, Chen, and U.S. Patent 6,069,055 to Ukeda et al. (hereinafter "Ukeda").

Ukeda teaches a dry etch process for anisotropically removing exposed regions of a polysilicon layer through a metal silicide layer. Ukeda does not teach or suggest that the process disclosed therein may be used to fabricate a fuse.

It is clear that Ukeda does not remedy the deficiencies of Mitani, Chen, and Fischer, and the knowledge that was generally available in the art prior to the filing date of the above-referenced application with respect to providing some motivation to one of ordinary skill in the art to combine the teachings of these references. It is also clear that Ukeda does not include any teaching that would give one of ordinary skill in the art a reasonable basis for expecting the combination of Mitani, Chen, Fischer, and Ukeda to provide a successful method for fabricating a fuse.

Claims 97-100 are each allowable, among other reasons, as depending from claim 71, which should be allowed.

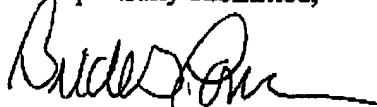
Withdrawal of the 35 U.S.C. § 103(a) rejections of claims 17-33, 50-72, 74-105 is respectfully requested.

Serial No. 09/277,893

**CONCLUSION**

It is respectfully submitted that each of claims 17-33, 50-72, 74-105 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



Brick G. Power  
Registration No. 38,581  
Attorney for Applicant  
TRASKBRITT, PC  
P.O. Box 2550  
Salt Lake City, Utah 84110-2550  
Telephone: 801-532-1922

Date: February 8, 2006

BGP/djp:eg

Document in ProLaw